REMARKS

This Amendment, submitted in response to the non-final Office Action dated March 29, 2004, is believed to be fully responsive to the points of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1, 4-11, 14-19 and 21-25 are pending. Claims 2, 3, 12, 13 and 20 are cancelled above. Claims 1, 4, 5, 10, 11, 14, 15, 18, 19, 21, 22 and 24 are amended. No new matter has been added by the amendments.

Claims 1, 2, 11 and 19 have been rejected under 35 USC 102(b) over EP 1050786 (Erno et al.). Claims 3-10, 12-18 and 21-25 have been rejected under 35 USC 103(a) over Erno et al., in view of GB 2350809 (Walton et al.) Applicants respectfully submit the following remarks in support of the patentability of the claims.

1.   Claims 1 and 4-10:

Claim 1 has been amended to include the additional recitations of original Claims 2 and 3. Claims 4-10 depend from Claim 1. As amended, Claim 1 is directed to a method of creating a tooling master model for a manufacturing process for a part. The tooling master model includes a tooling geometry for the part, and the manufacturing process includes at least one manufacturing step. A manufacturing context model is generated from a parametric model for the part. The manufacturing context model includes a number of tooling features, and the parametric model includes a number of geometric dimensions and tolerances (GD&T). The generation of the manufacturing context model includes orienting the parametric model using the geometric dimensions and tolerances, to obtain an oriented GD&T model, and applying a number of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step.

Erno is directed to a method for designing, and optionally making, a part. (Abstract) As noted by the Examiner, Erno does not teach that the parametric model includes a number of geometric dimensions and tolerances (GD&T). Nor does Erno disclose orienting the parametric model using a number of geometric dimensions and tolerances, to obtain an oriented GD&T model, and applying a number of manufacturing

design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step, as recited by amended Claim 1.

Walton is cited as supplying the above-described deficiencies of Erno. In particular the abstract and FIGS. 5, 10, 11 and 14-19 are cited as disclosing geometric manipulation of a parametric model in preparation for manufacturing, including boundary mapping. (Page 3 of Office Action) However, as Applicants understand the reference, Walton, does not disclose orienting a parametric model using a number of geometric dimensions and tolerances, to obtain an oriented GD&T model, and applying a number of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step, as recited by amended Claim 1.

Rather, Walton is directed to a method of performing mechanical operations upon components having initial surface shapes or configurations in order to achieve a desired surface shape or configuration. (Abstract, Claim 1) The process is described on page 7 of Walton with reference to FIG. 5. At step 501, an engineering model is identified for the component representing an originally optimized design. (Page 7 lines 14-17, FIG. 5) At step 502, a description of an initial configuration is derived, specifying the particular configuration for an actual component in its initial state. (Page 7 lines 21-23, FIG. 5) The initial description may refer to a component that is being repaired, or it may describe a new component at a partial stage of the manufacturing process. (Page 7, lines 23-26) At step 503, the engineering model is manipulated with the components initial description to produce a component model, specific to the particular component under consideration but sympathetic with the original engineering model. (Page 8, lines 2-6, FIG. 5) Thus, as Applicants understand the reference, Walton teaches modifying an optimized design for a part based on the particular configuration of an actual component. Accordingly, Applicants respectfully submit that neither the Abstract nor FIG. 5 disclose the above-described features of amended Claim 1.

In addition to FIG. 5 and the Abstract, the Office Action cites FIGS. 10, 11 and 14-19 of Walton. Applicants respectfully submit that Walton does not disclose the above-discussed features of amended Claim 1. For example, FIG. 10 shows a processed engineering model. (Page 14, lines 1-2) The dimensions in directions 1002 and 1003 have been expanded by means of applying an arithmetic off-set. (Page 14, lines 4-7) Based on the description beginning at line 26 on Page 16 and continuing to page 17, line

5, Applicants' undersigned representative understands the off-sets to represent the diameter of disc 1202, where the component is probed by disc 1202. Accordingly, Applicants respectfully submit that FIG. 10 does not disclose the above-discussed features of amended Claim 1.

Nor do the other Figures cited on page 3 of the Office Action disclose orienting a parametric model using a number of geometric dimensions and tolerances, to obtain an oriented GD&T model, and applying a number of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step, as recited by amended Claim 1. Rather, FIG. 11 shows the profile 1016 as a cross-section through the model. (Page 14, lines 22-25) FIG. 14 shows the recordation of a number of locations. (Page 16, lines 26-27) The data shown in FIG. 14 is obtained via probing by disc 1202. (Page 15) The displacement of these location points from the component's surface is equal to the diameter of disc 1202. (Page 17, lines 1-3) FIG. 15 illustrates the generation of a best-fit curve from the points in FIG. 14. (Pages 4 and 17, lines 6-8) The curve 1501 represents an outline displaced from the contour of the component by a fixed value equal to the diameter of disc 1202. (Page 17, lines 11-14) FIG. 16 shows the off-set profile 1602 obtained using off set vectors 1601 with magnitude equal to the diameter of disc 1202. (Page 17, lines 15-19) New curve 1602 represents the outline of the component itself. (Page 17, lines 19-21) FIG. 17 illustrates the overlaying of a model profile against a measured description. (Pages 5 and 17, lines 22-25) The transformation vectors shown in FIG. 17 are determined for all positions on the model profile 1016, each representing a direction and a minimum distance through which it is necessary for a position on the model profile to be translated into a location on the component profile. (Page 18, lines 7-11) FIG. 18 shows a complete component model. (Page 19, lines 5-7) FIG. 19 details the procedures 504 for the generation of a machine tool program. (Page 19, lines 24-25) As with respect to the other figures, no discussion of orienting a parametric model using a number of geometric dimensions and tolerances is presented with respect to FIG. 19, and only a statement that the tool path takes account of tool radius and applies an off-set (page 20, lines 2-3) is made. Accordingly, Applicants respectfully submit that FIGS. 11 and 14-19 do not disclose the above-discussed features of amended Claim 1.

In view of the above, Applicants respectfully submit that Claim 1 is patentably distinguishable over the cited art. Further, as Claims 4-10 depend from Claim 1, these claims are also patentably distinguishable over the cited art for at least these reasons, and Applicants respectfully request that the rejections of Claims 1 and 4-10 be withdrawn.

2.   Claims 11 and 14-18:

Claim 11 has been amended to include the additional recitations of original Claims 12 and 13. Claims 14-18 depend from Claim 11. Amended Claim 11 is directed to a system for generating a tooling master model for a manufacturing process for a part. The tooling master model includes a tooling geometry and the manufacturing process includes at least one manufacturing step. The system includes a computer aided design (CAD) system configured to receive a parametric model and to generate a manufacturing context model from the parametric model, where the manufacturing context model includes a number of tooling features. The CAD system is further configured to orient the parametric model after processing with a number of geometric dimensions and tolerances to obtain an oriented GD&T model, and the CAD system is further configured to process the parametric model with producibility data to add the geometric dimensions and tolerances to the parametric model. The system further includes a knowledge based environment configured to apply a number of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step.

Claims 11 and 14-18 stand rejected over Erno, in view of Walton. The Office Action notes that Erno does not disclose a CAD system that is configured to orient a parametric model after processing with a number of geometric dimensions and tolerances to obtain an oriented GD&T model. Walton is cited to supply this deficiency. However, as discussed above with respect to Claim 1, Applicants respectfully submit that Walton does not disclose this recitation of Claim 11.

In addition, Applicants respectfully submit that the cited art does not disclose a CAD system configured to process the parametric model with producibility data to add the geometric dimensions and tolerances to the parametric model, as recited by Claim 11. For at least these reasons, Applicants respectfully submit that Claim 11 is patentably distinguishable over the cited art. Further, as Claims 14-18 depend from Claim 11, these

claims are also patentably distinguishable over the cited art for at least these reasons, and Applicants respectfully request that the rejections of Claims 11 and 14-18 be withdrawn.

3.   Claims 19 and 21-25:

Claim 19 has been amended to include the additional recitations of original Claim 20. Claims 21-25 depend from Claim 19. Amended Claim 19 is directed to a method of manufacturing that includes generating a manufacturing context model for a manufacturing process for a part from a parametric model. The manufacturing context model includes a number of tooling features, and the manufacturing process includes at least one manufacturing step. The method of manufacturing further includes creating a tooling master model from the manufacturing context model, where the tooling master model includes a tooling geometry for the part, generating a hard tooling using the tooling master model, and manufacturing at least one part using the hard tooling and a number of process parameters. Generation of the manufacturing context model includes orienting the parametric model with a number of geometric dimensions and tolerances to obtain an oriented GD&T model, and applying a number of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step. The manufacturing design rules include a number of tooling design rules.
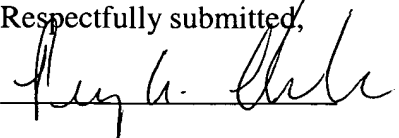
Claims 19 and 21-25 stand rejected over Erno, in view of Walton. The Office Action notes that Erno does not disclose orienting the parametric model with a number of geometric dimensions and tolerances to obtain an oriented GD&T model. Walton is cited to supply this deficiency. However, as discussed above with respect to Claim 1, Applicants respectfully submit that Walton does not disclose this recitation of Claim 19. For at least these reasons, Applicants respectfully submit that Claim 19 is patentably distinguishable over the cited art. Further, as Claims 21-25 depend from Claim 19, these claims are also patentably distinguishable over the cited art for at least these reasons, and Applicants respectfully request that the rejections of Claims 19 and 21-25 be withdrawn.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact Applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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